TABLES

Table 1
Input Parameters for 2016 Mounding Analysis
100 Long Ridge Road, Carlisle, MA

Parameter	Values Used	Notes
Length (E-W) of Recharge Area (ft)	45	Area 1, from Applicant Plan P dated 2/2/16
	49	Area 2, from Applicant Plan P dated 2/2/16
	53	Area 3, from Applicant Plan P dated 2/2/16
Width (N-S) of Recharge Area (ft)	45	Area 1, from Applicant Plan P dated 2/2/16
	43	Area 2, from Applicant Plan P dated 2/2/16
	38	Area 3, from Applicant Plan P dated 2/2/16
Recharge Volume (gpd)	1980	Applicant Estimate, Area 1
	2970	Town Estimate, Area 1
	1980	Applicant Estimate, Area 2
	2970	Town Estimate, Area 2
	1980	Applicant Estimate, Area 3
	2970	Town Estimate, Area 3
Recharge Rate (ft/day)	0.1305	Recharge volume divided by leachfield Area 1 (Applicant Est.)
	0.1958	Recharge volume divided by leachfield Area 1 (Town Est.)
	0.1255	Recharge volume divided by leachfield Area 2 (Applicant Est.)
	0.1882	Recharge volume divided by leachfield Area 2 (Town Est.)
	0.1313	Recharge volume divided by leachfield Area 3 (Applicant Est.)
	0.1969	Recharge volume divided by leachfield Area 3 (Town Est.)
Saturated Thickness(ft)	9.65	Area 1, average of MW1 and 1A from 2015 slug tests by NGI
	8.26	Area 2, average of thicknesses for Areas 1 and 3
	6.86	Area 3, average of MW2, 2A from2015 slug tests by NGI
Hydraulic Conductvity (ft/day)	2.8x10e-2 to 14.2	sieve analysis range; not used because of high percentages of fines and gravel in soil samples
	9	geometric mean (range from 2.08-23.75 ft/day) of slug test results
	19.1	Area 1 (average of MW1 and 1A slug tests, NGI, 2015)
	8.23	Area 2 value from NGI, 2016, Table 1C
	9.98	Area 3 (average of MW2 and 2A slug tests, NGI, 2015)
Specific Yield	0.07	Based on literature value for sandy clay (Fetter, 1988); used by NGI, 2015
	0.195	Based on literature value for fine sand/silt (Fetter 1988); used by Nobis
Duration (days)	30	used by NGI, 2015
	90	low end of DEP range for septic systems >2000 gpd; requested by Town
	180	high end of DEP range for septic systems >2000 gpd

Notes: 1. No site specific data is available for Septic Disposal Area 2.
2. Slug test results are from NGI report dated March 25, 2015 (Brem_193)
3. Hydraulic conductivity value for Area 2 is from NGI report dated August 8, 2016 (Brem_297)

Table 2
Mounding Analysis Results
100 Long Ridge Road, Carlisle, MA
Applicant Loading Rates: 1980 gpd for each Proposed Septic Disposal Area

Trial	Average Depth to Water for Area, measured by NGI 1/23/15	Estimated Groundwater Mounding Potential(ft) 90 days	Estimated Groundwater Mounding Potential(ft) 180 days	Depth to Top of Mound (ft bgs) 90 days	Depth to Top of Mound (ft bgs) 180 days	*Notes*
1	6.63	1.36	1.50	5.27	5.13	Area 1; starting saturated thickness 9.65; k=9
2	6.63	0.74	0.81	5.89	5.82	Area 1; starting saturated thickness 9.65; k=19.1
3	5.86	1.51	1.67	4.35	4.19	Area 2; starting saturated thickness 8.26; k=9
4	5.86	1.62	1.79	4.24	4.07	Area 2; starting saturated thickness 8.26; k=8.23
5	5.08	1.72	1.91	3.36	3.17	Area 3; starting saturated thickness 6.86; k=9
6	5.08	1.59	1.76	3.49	3.32	Area 3; starting saturated thickness 6.86; k=9.98

Notes:

1. All trials used an on-line version of Aqtesolve's mound calculator for a rectangular area, based on Hantush (1967).
2. Depth to water for Areas 1 and 3 averaged from pairs of wells in each location, measured by NGI and reported in NGI 3/25/15 report (Brem_193).
3. Depth to water for Area 2 is average of the average depths for Areas 1 and 3.
4. Saturated thickness for Area 1 is average for MW1 & MW1A on 2/13/15 (date of slug test), reported in Brem_193.
5. Saturated thickness for Area 2 is average of saturated thicknesses for Areas 1 and 3; no site specific data is available.
6. Saturated thickness for Area 3 is average for MW2 & MW2A on 2/13/15 (date of slug test), reported in Brem_193.
7. Hydraulic conductivity for Trials 1,3,&5 is the geometric mean hydraulic conductivity from NGI 3/25/15 report (Brem_193).
8. Hydraulic conductivity for Trial 2 is the average of slug tests for MW1 & MW1A by NGI on 2/13/15.
9. Hydraulic conductivity value for Trial 4 is from NGI report dated 8/8/16 (Brem_297).
10. Hydraulic conductivity for Trial 6 is the average of slug tests for MW3& MW3A by NGI on 2/13/15.
11. For trials 1,2,5,6, Depth to Top of Mound is calculated by subtracting the calculated maximum mound height from the average depth to water (in MWs for that area) measured by NGI on 1/23/15, reported in Brem_193.
12. For trials 3 and 4, Depth to Top of Mound is calculated by subtracting the calculated maximum mound height from the estimated depth to water in Area 2; no direct measurements are available.
13. All trials used specific yield of 0.195, published value for fine sand/silt (Fetter, 1988).

Table 3
Mounding Analysis Results
100 Long Ridge Road, Carlisle, MA
Town Loading Rates: 2970 gpd for each Proposed Septic Disposal Area

Trial	Average Depth to Water for Area, measured by NGI 1/23/15	Estimated Groundwater Mounding Potential(ft) 90 days	Estimated Groundwater Mounding Potential(ft) 180 days	Depth to Top of Mound (ft bgs) 90 days	Depth to Top of Mound (ft bgs) 180 days	Notes
1	6.63	1.98	2.19	4.65	4.44	Area 1; starting saturated thickness 9.65; k=9
2	6.63	1.09	1.20	5.54	5.43	Area 1; starting saturated thickness 9.65; k=19.1
3	5.86	2.19	2.42	3.67	3.44	Area 2; starting saturated thickness 8.26; k=9
4	5.86	2.34	2.60	3.52	3.26	Area 2; starting saturated thickness 8.26; k=8.23
5	5.08	2.48	2.74	2.60	2.34	Area 3; starting saturated thickness 6.86; k=9
6	5.08	2.3	2.54	2.78	2.54	Area 3; starting saturated thickness 6.86; k=9.98

Notes:

1. All trials used an on-line version of Aqtesolve's mound calculator for a rectangular area, based on Hantush (1967).
2. Depth to water for Areas 1 and 3 averaged from pairs of wells in each location, measured by NGI and reported in NGI 3/25/15 report (Brem_193).
3. Depth to water for Area 2 is average of the average depths for Areas 1 and 3.
4. Saturated thickness for Area 1 is average for MW1 & MW1A on 2/13/15 (date of slug test), reported in Brem_193.
5. Saturated thickness for Area 2 is average of saturated thicknesses for Areas 1 and 3; no site specific data is available.
6. Saturated thickness for Area 3 is average for MW2 & MW2A on 2/13/15 (date of slug test), reported in Brem_193.
7. Hydraulic conductivity for Trials 1,3,&5 is the geometric mean hydraulic conductivity from NGI 3/25/15 report (Brem_193).
8. Hydraulic conductivity for Trial 2 is the average of slug tests for MW1 & MW1A by NGI on 2/13/15.
9. Hydraulic conductivity value for Trial 4 is from NGI report dated 8/8/16 (Brem_297).
10. Hydraulic conductivity for Trial 6 is the average of slug tests for MW3& MW3A by NGI on 2/13/15.
11. For trials 1,2,5,6, Depth to Top of Mound is calculated by subtracting the calculated maximum mound height from the average depth to water (in MWs for that area) measured by NGI on 1/23/15, reported in Brem_193.
12. For trials 3 and 4, Depth to Top of Mound is calculated by subtracting the calculated maximum mound height from the estimated depth to water in Area 2; no direct measurements are available.
13. All trials used specific yield of 0.195, published value for fine sand/silt (Fetter, 1988).

TABLE 4

MASS-BALANCE NITRATE LOADING ANALYSES - MULTIPLE SCENARIOS

100 Long Ridge Road
Carlisle, Massachusetts

	Scenario	Defined Area	Wastewater Daily Volume Value Applied	Nitrate Concentration (mg/L)
Proposed Septic Disposal Area 1	1	AOI	Applicant	16.3
	2	AOI	Town	17.1
	3	Alt 1	Applicant	14.3
	4	Alt 1	Town	15.6
	5	Alt 2	Applicant	13.7
	6	Alt 2	Town	15.1

	Scenario	Defined Area	Wastewater Daily Volume Value Applied	Nitrate Concentration (mg/L)
Proposed Septic Disposal Area 2	7	AOI 2A	Applicant	17.0
	8	AOI 2A	Town	17.6
	9	AOI 2B	Applicant	17.9
	10	AOI 2B	Town	19.0
	11	AOI 2C	Applicant	15.4
	12	AOI 2C	Town	17.1

	Scenario	Defined Area	Wastewater Daily Volume Value Applied	Nitrate Concentration (mg/L)
Proposed Septic Disposal Area 3	13	AOI 3A	Applicant	11.5
	14	AOI 3A	Town	13.2
	15	AOI 3B	Applicant	7.5
	16	AOI 3B	Town	9.4

Assumptions

Applicant wastewater volume value = 2735708.58 L/yr, existing 4-bedroom house wastewater volume value = 607935.24 L/yr
Town wastewater volume value = 4103562.87 L/yr, existing 4-bedroom house wastewater volume value = 911902.86 L/yr
Recharge from precipitation = 1.5 ft./yr
Nitrate load from fertilizer = 933 mg/1000 $ft.^2$